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Thomas M. Church

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University of Delaware
College of Marine Studies
Newark, DE 19711

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14. ABSTRACT

A two-day symposium entitled "Progress in marine Chemistry" was held at the 200th meeting of the American Chemical Society in Washington, D.C. 28-29 August 1990. The meeting was attended by over 50 participants. The meeting included approximately 24 presentations on select topics of physical, inorganic, redox speciation, and organic marine chemistry, about half of which are being published in a special issue of *Marine Chemistry*. Several noted foreign marine chemists were among the speakers and supported by this PRF grant. The occasion was also used to honor the life-long contributions of Edward D. Goldberg to the field of marine chemistry. Some of Dr. Goldberg's students and associates used this symposium to document, in their presentations, the outstanding contributions that he has made to the progress of marine chemistry.

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Final Report

200th American Chemical Society Geochemistry Division Symposium,

"Progress in Marine Chemistry"

Introduction:

A two-day symposium entitled "Progress in Marine Chemistry" was held at the 200th meeting of the American Chemical Society in Washington, D.C. 28-29 August 1990. The meeting was attended by over 50 participants. The meeting included approximately 24 presentations on select topics of physical, inorganic, redox speciation, and organic marine chemistry, about half of which are being published in a special issue of *Marine Chemistry*. Several noted foreign marine chemists were among the speakers and supported by this PRF grant. The occasion was also used to honor the life-long contributions of Edward D. Goldberg to the field of marine chemistry. Some of Dr. Goldberg's students and associates used this symposium to document, in their presentations, the outstanding contributions that he has made to the progress of marine chemistry.

Symposium Synopsis:

The symposium papers addressed the topics of physical, inorganic, redox speciation, and organic aspects of marine chemistry. Examples of discussion included chemistry and nature of marine particles, effective utility and accuracy of ion interaction models, redox processes, biogeochemical equilibrium, atmospheric coupling, photochemistry, and techniques of speciation. Included was the need still for some accurate fundamental constants for sea water such as the second dissociation constant of carbonic acid or hydrogen sulfide.

Dr. Edward Goldberg noted that in 1946 the chemical description of sea water was just 46 lines. However, the growth of modern marine chemistry has ultimately been linked to modern instrumentation. New tools and technology for doing speciation to explore new concepts is paramount. These include for example scanning tunneling microscopy (STM) for particles of both super- and sub-micron size. Although the costs of instruments to perform surface analysis is large, the importance of surface reactions for marine chemistry is equally important. Other examples include molecular orbital laser spectrometry (MOLE), laser (LAMA). Ultimately, one needs to put the instrumentation in the ocean and not just bring the sample to the instrument.

Summary/Conclusions:

Future CTD instruments could contain a multiple array of analytical probes; laser fluorescence can be mounted in towed packages. To choose the best instrumentation, one must first ask the appropriate question in terms of the process that needs to be studied. Such processes need to be studied preferably at sea with appropriate *in situ* techniques at the nano to pico molar level. In the end, modern marine chemical instrumentation should strive to be molecularly specific and not fraught with operational ambiguity or at least choosing the appropriate operation measurements. A recent example is the deficiency of previous techniques to accurately analyze the DOC pool until the recent advent of the appropriate catalytic systems. However, one could argue that the more appropriate modern measurement is no longer the total pool but the organic component classes to reveal the nature of the refractory fraction. Related is the nature of bio-macropolymers that may be the precursors of marine colloid formation.